WHAT IS CLAIMED:

1. An electronic device, comprising:

a substrate;

an anode on said substrate;

an organic layer on said anode;

a cathode on said organic layer; and

at least one of: (1) a first interfacial layer between said anode and said organic layer and (2) a second interfacial layer between said organic layer and said cathode,

wherein said first interfacial layer includes a plurality of hole traps to accumulate a portion of a plurality of holes so that at least some of said plurality of holes can tunnel from said anode through said first interfacial layer to said organic layer, and

said second interfacial layer includes a plurality of electron traps to accumulate a portion of a plurality of electrons so that at least some of said plurality of electrons can tunnel from said cathode through said second interfacial layer to said organic layer.

2. The electronic device of claim 1 wherein

an increase in accumulation of said portion of said plurality of holes increases an electric field across said first interfacial layer that increases bending of bands of said first interfacial layer which increases said at least some of said plurality of holes that can tunnel from said anode to said organic layer, and

an increase in accumulation of said portion of said plurality of electrons increases an electric field across said second interfacial layer that increases bending of bands of said second interfacial layer which increases said at least some of said plurality of electrons that can tunnel from said cathode to said organic layer.

3. The electronic device of claim 2 wherein

said bands of said first interfacial layer are uniformly bent, and

said bands of said second interfacial layer are uniformly bent.

4. The electronic device of claim 2 wherein

said bands of said first interfacial layer are non-uniformly bent, and

said bands of said second interfacial layer are non-uniformly bent.

5. The electronic device of claim 1 wherein

an energy barrier to trap holes between HOMO levels of said plurality of hole traps and HOMO levels of a plurality of host components of said first interfacial layer is large enough so that accumulation of said portion of said plurality of holes causes bands of said first interfacial layer to bend, and

an energy barrier to trap electrons between LUMO levels of said plurality of electron traps and LUMO levels of a plurality of host components of said second interfacial layer is large enough so that accumulation of said portion of said plurality of electrons causes bands of said second interfacial layer to bend.

6. The electronic device of claim 1 wherein

said at least some of said plurality of holes tunnel from said anode to said organic layer when a Fermi level of said anode is at or below a HOMO level of said organic layer, and

said at least some of said plurality of electrons tunnel from said cathode to said organic layer when a Fermi level of said cathode is at or above a LUMO level of said organic layer.

7. The electronic device of claim 1 wherein

a density of said plurality of hole traps is greater than $10^{14}/cm^2$, and

a density of said plurality of electron traps is greater than $10^{14}/cm^2$.

8. The electronic device of claim 1 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said first interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode to said HOMO levels.

9. The electronic device of claim 1 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said first interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of holes cannot thermonically inject from said anode to said HOMO levels of said plurality of host components; and

a hole injection barrier between said anode and HOMO levels of a plurality of hole traps is small enough that when said typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode directly to said HOMO levels of said plurality of hole traps.

10. The electronic device of claim 1 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said second interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode to said LUMO levels.

11. The electronic device of claim 1 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said second interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of electrons cannot thermonically inject from said cathode to said LUMO levels of said plurality of host components; and

an electron injection barrier between said cathode and LUMO levels of a plurality of electron traps is small enough that when said typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode directly to said LUMO levels of said plurality of electron traps.

12. The electronic device of claim 1 wherein said electronic device is any one of: an OLED pixel, an OLED light source element, or a phototransistor.

13. A method to fabricate an electronic device, comprising:

depositing an anode on a substrate;

optionally depositing a first interfacial layer on said anode, said first interfacial layer includes a plurality of hole traps;

depositing an organic layer on said first interfacial layer if present, otherwise, on said anode; and

optionally depositing a second interfacial layer on said organic layer, said second interfacial layer includes a plurality of electron traps; and

depositing a cathode on said second interfacial layer if present, otherwise, on said organic layer,

wherein at least one of said first interfacial layer and said second interfacial layer is deposited and

said plurality of hole traps accumulate a portion of a plurality of holes so that at least some of said plurality of holes can tunnel from said anode through said first interfacial layer to said organic layer, and

said plurality of electron traps accumulate a portion of a plurality of electrons so that at least some of said plurality of electrons can tunnel from said cathode through said second interfacial layer to said organic layer.

14. The method of claim 13 wherein

an energy barrier to trap holes between a HOMO level of said plurality of hole traps and a HOMO level of another component of said first interfacial layer is large enough so that accumulation of said portion of said plurality of holes causes bands of said first interfacial layer to bend, and

an energy barrier to trap electrons between a LUMO level of said plurality of electron traps and a LUMO level of another component of said second interfacial layer is large enough so that accumulation of said portion of said plurality of electrons causes bands of said second interfacial layer to bend.

15. The method of claim 13 wherein

said at least some of said plurality of holes tunnel from said anode to said organic layer when a Fermi level of said anode is at or below a HOMO level of said organic layer, and

said at least some of said plurality of electrons tunnel from said cathode to said organic layer when a Fermi level of said cathode is at or above a LUMO level of said organic layer.

16. The method of claim 13 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said first interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode to said HOMO levels.

17. The method of claim 13 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said first interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of holes cannot thermonically inject from said anode to said HOMO levels of said plurality of host components; and

a hole injection barrier between said anode and HOMO levels of a plurality of hole traps is small enough that when said typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode directly to said HOMO levels of said plurality of hole traps.

18. The method of claim 13 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said second interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode to said LUMO levels.

19. The method of claim 13 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said second interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of electrons cannot

thermonically inject from said cathode to said LUMO levels of said plurality of host components; and

an electron injection barrier between said cathode and LUMO levels of a plurality of electron traps is small enough that when said typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode directly to said LUMO levels of said plurality of electron traps.

20. The method of claim 13 wherein

depositing said first interfacial layer includes

adding a first dopant that traps holes to a first host material,

mixing said first dopant and said first host material to form a first polymer solution, and

spin-coating said first polymer solution onto said anode to form said first interfacial layer; and

depositing said second interfacial layer includes

adding a second dopant that traps electrons to a second host material,

mixing said second dopant and said second host material to form a second polymer solution, and

spin-coating said second polymer solution onto said organic layer to form said second interfacial layer.

21. The method of claim 13 wherein

depositing said first interfacial layer includes

evaporating a first host small molecule material onto said anode, and

co-evaporating a hole trapping small molecule material onto said anode; and

depositing said second interfacial layer includes

evaporating a second host small molecule material onto said anode, and

co-evaporating an electron trapping small molecule material onto said anode.

22. In an electronic device, a method to inject at least some of a plurality of holes from an anode to an organic layer where an energy barrier between said two layers is large, comprising:

injecting a portion of said plurality of holes from said anode to an interfacial layer;

trapping said portion of said plurality of holes using a plurality of hole traps within said interfacial layer;

upon trapping an adequate number of said portion of said plurality of holes at said interfacial layer, bending bands of said interfacial layer to lower said energy barrier; and

upon adequate bending of bands of said interfacial layer, injecting said at least some of said plurality of holes from said anode to said organic layer by tunneling.

23. The method of claim 22 wherein

adequate bending of said bands of said interfacial layer occurs when a Fermi level of said anode is at or below a HOMO level of said organic layer; and

trapping said adequate number of said portion of said plurality of holes at said interfacial layer occurs when an electric field is generated across said interfacial layer,

wherein said electric field causes bending of said bands of said interfacial layer.

24. In an electronic device, a method to inject at least some of a plurality of electrons from a cathode to an organic layer where an energy barrier between said two layers is large, comprising:

injecting a portion of said plurality of electrons from said cathode to an interfacial layer;

trapping said portion of said plurality of electrons using a plurality of electron traps within said interfacial layer;

upon trapping an adequate number of said portion of said plurality of electrons at said interfacial layer, bending bands of said interfacial layer to lower said energy barrier; and

upon adequate bending of bands of said interfacial layer, injecting said at least some of said plurality of electrons from said cathode to said organic layer by tunneling.

25. The method of claim 24 wherein

adequate bending of said bands of said interfacial layer occurs when a Fermi level of said cathode is at or above a LUMO level of said organic layer; and

trapping said adequate number of said portion of said plurality of electrons occurs when an electric field is generated across said interfacial layer,

wherein said electric field causes bending of said bands of said interfacial layer.

26. An electronic device, comprising:

a substrate;

a cathode on said substrate;

an organic layer on said cathode;

an anode on said organic layer; and

at least one of: (1) a first interfacial layer between said cathode and said organic layer and (2) a second interfacial layer between said organic layer and said anode,

wherein said first interfacial layer includes a plurality of electron traps to accumulate a portion of a plurality of electrons so that at least some of said plurality of electrons can tunnel from said cathode through said first interfacial layer to said organic layer, and

said second interfacial layer includes a plurality of hole traps to accumulate a portion of a plurality of holes so that at least some of said plurality of holes can tunnel from said anode through said second interfacial layer to said organic layer.

27. The electronic device of claim 26 wherein

an increase in accumulation of said portion of said plurality of electrons increases an electric field across said first interfacial layer that increases bending of bands of said first interfacial layer which increases said at least some of said plurality of electrons that can tunnel from said cathode to said organic layer, and

an increase in accumulation of said portion of said plurality of holes increases an electric field across said second interfacial layer that increases bending of bands of said second interfacial layer which increases said at least some of said plurality of holes that can tunnel from said anode to said organic layer.

28. The electronic device of claim 26 wherein

an energy barrier to trap electrons between a LUMO level of said plurality of electron traps and a LUMO level of another component of said first interfacial layer is large enough so that accumulation of said portion of said plurality of electrons causes bands of said first interfacial layer to bend, and

an energy barrier to trap holes between a HOMO level of said plurality of hole traps and a HOMO level of another component of said second interfacial layer is large enough so that accumulation of said portion of said plurality of holes causes bands of said second interfacial layer to bend.

29. The electronic device of claim 26 wherein

said at least some of said plurality of holes tunnel from said anode to said organic layer when a Fermi level of said anode is at or below a HOMO level of said organic layer, and

said at least some of said plurality of electrons tunnel from said cathode to said organic layer when a Fermi level of said cathode is at or above a LUMO level of said organic layer.

30. The electronic device of claim 26 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said second interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode to said HOMO levels.

31. The electronic device of claim 26 wherein

a hole injection barrier between said anode and HOMO levels of a plurality of host components of said second interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of holes cannot thermonically inject from said anode to said HOMO levels of said plurality of host components; and

a hole injection barrier between said anode and HOMO levels of a plurality of hole traps is small enough that when said typical operating voltage is applied, said portion of said plurality of holes can thermonically inject from said anode directly to said HOMO levels of said plurality of hole traps.

32. The electronic device of claim 26 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said first interfacial layer is small enough that when a typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode to said LUMO levels.

33. The electronic device of claim 26 wherein

an electron injection barrier between said cathode and LUMO levels of a plurality of host components of said first interfacial layer is large enough that when a typical operating voltage is applied, said portion of said plurality of electrons cannot thermonically inject from said cathode to said LUMO levels of said plurality of host components; and

an electron injection barrier between said cathode and LUMO levels of a plurality of electron traps is small enough that when said typical operating voltage is applied, said portion of said plurality of electrons can thermonically inject from said cathode directly to said LUMO levels of said plurality of electron traps.